

Feasibility of using fishwheels for long-term monitoring of Chinook salmon escapement on the Copper River

Abstract: The purpose of this project was to assess the feasibility of using fishwheels and twosample mark-recapture methods for long-term monitoring of Chinook salmon *Oncorhynchus tshawytscha* escapement on the Copper River. This report summarizes results from the third and final year of this project. Objectives for 2003 were to: (1) evaluate the efficacy of installing and operating two fishwheels in Baird Canyon and two fishwheels near Wood Canyon; (2) estimate the ability of these fishwheels to capture Chinook salmon throughout the entire run; and (3) generate a system-wide abundance estimate for Chinook salmon returning to the Copper River. For the first sample event, two live-capture fishwheels were operated at Baird Canyon for 2,193 h from 16 May to 9 July. During this period, 2,251 adult Chinook salmon were captured and 2,077 fish were marked (1,577 spaghetti tags and 500 radio tags). For the second sample event, two fishwheels were operated near the lower end of Wood Canyon for 2,475 h from 21 May to 20 July. A total of 1,928 Chinook salmon were captured and 1,844 fish were examined, of which 100 were recaptures. A total of 354 fish sampled in the first event and 214 fish sampled in the second event were censored from the abundance calculations. The probability of a fish being marked at Baird Canyon and the probability of a marked fish being recaptured at Canyon Creek were not independent of time. Using a temporally stratified estimator, estimated abundance of Chinook salmon measuring 810 to 1,070 mm FL that migrated upstream of Baird Canyon from 17 May to 1 July was 44,764 (SE = 12,506). This estimate was based on 1,723 marked fish available for recovery (1,325 spaghetti tags and 398 radio tags), 1,630 fish examined for marks during the second sample event and 97 recaptures (72 spaghetti tags and 25 radio tags). The median travel time of fish tagged at Baird Canyon and recaptured at Canyon Creek approximately 91 km upstream was 13.0 d (range = 5-30 d, n = 101).

Despite the numerous and often significant challenges encountered during this study, it has continued to meet or exceed all project objectives and expectations. Drainage-wide abundance estimates for Chinook salmon were generated in two out of three years (2002 and 2003). The project has evolved into a long-term monitoring program that has made the Native Village of Eyak (NVE) an integral part of Copper River salmon research. In addition, this project has demonstrated that federal, state and tribal agencies can work cooperatively to collect stock-assessment data that will be used to assess current management practices. Based on the first three years of results, it appears that fishwheels and mark-recapture methods can be used to estimate the inriver abundance of Chinook salmon on the Copper River.

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